

Unit 10 Review

In addition to knowing vocab definitions, be able to apply them to understand the following:

Ch 40

- Ecology
 - Be able to rank the hierarchy of ecologies from most to least inclusive
 - Which is the least inclusive level that includes both biotic AND abiotic factors?
- Climate
 - What causes latitudinal variations in climate?
 - Why is the tilt of the Earth so important? (And what would happen if the tilt changed?)
- Terrestrial Biomes
 - Given a world map, identify which biomes are found at various locations
 - What climate (temp and precip) would you expect in those locations?
 - What are the defining features of each biome?
 - What similarities and differences do you notice in each biome?
 - How have humans influenced those biomes?
 - The organisms found in particular biomes depend on what factors?
 - What happens to the climate and vegetation as one moves up a mountain?
- Aquatic Biomes
 - What regions would be most vs least affected by decreased light availability?
 - Which have the highest vs lowest rates of primary productivity?
- Distribution
 - What biotic vs abiotic factors affect the distribution of organism?
- Dispersion
 - What environmental and social factors typically result in each of the following patterns of dispersion?
 - Clumped vs uniform vs random
- Survivorship Curves
 - Be able to label a Type I vs II vs III survivorship curve
 - Given a type of organism, which survivorship curve would it follow and WHY?
- Exponential and Logistic Models
 - What factors affect change in population size?
 - Given the per capita birth rate and death rate, be able to calculate the number of individuals added to/lost from a given population
 - When does zero population growth occur?
 - Given the original population size, be able to calculate
 - # of births that year (given the birth rate)
 - Total population the following year (given the growth rate)
 - In what types of populations would you expect a J-shaped vs an S-shaped population growth curve and WHY?
 - Be able to calculate change in population size (dN/dt) using the logistic population growth model
 - As the population size approaches the carrying capacity, what happens to the growth rate and WHY?

- Population Dynamics
 - An organism's life history is comprised of what 3 traits?
 - What is the difference between K and r-selection?
 - In what types of situations/environments would you find each?
 - What factors contribute to density-dependent vs density-independent regulation of populations?
 - How do predators and prey affect each other's population densities?

Ch 41

- Competition
 - What is the competitive exclusion principle?
 - How does a niche compare to a habitat?
 - How can organisms avoid direct competition?
 - What is the difference between an organism's fundamental and realized niche?
 - How can you determine if they are different?
 - How does character displacement relate to allopatric and sympatric speciation?
- Predation
 - Be able to classify examples of cryptic coloration, aposematic coloration, Batesian mimicry, and Müllerian mimicry
- Symbiosis
 - Be able to define and classify examples of parasitism, mutualism, commensalism, and facilitation
- Diversity and Trophic Structures
 - Be able to determine which community is more diverse by applying the 2 components of species diversity
 - How do invasive species impact a community and why?
 - Given a food web, be able to classify which organisms are:
 - Producers; Primary, Secondary, Tertiary Consumers; Decomposers
 - Herbivores, Carnivores, Omnivores, Detritivores
 - How do keystone species and ecosystem engineers impact communities?
 - How do the bottom-up vs top-down models work?
 - Which does biomanipulation apply and how can it help an ecosystem?
- Disturbance
 - How do high, low, and intermediate disturbance levels affect species?
 - When/where does primary vs secondary succession occur?
 - How can early-arriving species impact later-arriving species?
 - How have human disturbances reduced species diversity?
- Biogeographic Factors
 - What two key factors affect a community's species diversity?
 - Where is species richness typically the greatest?
- Pathogens
 - What are zoonotic pathogens and how are they transferred?

Ch 42

- Energy and Matter
 - How do the movement of energy vs matter in an ecosystem differ?
 - Review the 1st and 2nd laws of thermodynamics
 - So why does energy appear to be lost at times?
 - Be able to define and classify examples of each of the following:
 - Autotrophs vs Heterotrophs
 - Producers; Primary, Secondary, Tertiary Consumers; Decomposers
 - Herbivores, Carnivores, Omnivores, Detritivores
- Energy and Limiting Factors
 - What is the difference between gross and net primary production?
 - What is NPP a more useful measurement than GPP?
 - What is standing crop?
 - What types of ecosystems are the most productive
 - Per unit area?
 - Overall?
 - How can net ecosystem production (NEP) be estimated?
 - What are the two primary limiting factors in aquatic ecosystems?
 - Which nutrients most often limit marine production?
 - What causes eutrophication?
 - What factors affect primary production in terrestrial ecosystems
 - On a large scale? On a more local scale?
 - How can this be improved?
- Energy Transfer
 - What is the difference between primary and secondary production?
 - What happens to the energy in a producer when feed upon by a consumer?
 - What is production vs trophic efficiency?
 - What is the typical trophic efficiency in an ecosystem?
 - Why is it so inefficient?
 - How does this influence the number of trophic levels in an ecosystem?
 - Which trophic levels could provide the most/least food for humans and why?
 - Be able to calculate the following (see Lab for help)
 - Net secondary production
 - Production efficiency
 - Biomass that can be supported given plant mass
 - Percentage of energy available for each trophic level
- Cycles
 - Where are the main reservoirs for carbon vs nitrogen vs phosphorus?
 - What is nitrogen fixation vs denitrification?
- Restoration
 - What is bioremediation vs biological augmentation?
 - Be able to classify examples of each

Ch 43

- Biodiversity
 - Which biome is the most diverse?
 - Why are we experiencing a biodiversity crisis?
 - What are the three components of biodiversity?
 - What is the difference between endangered and threatened species?
 - Why should we care about biodiversity?
 - What is the greatest threat to biodiversity?
 - Why can introduced species have such a negative impact on ecosystems?
 - What is acid precipitation?
- Population Conservation
 - What is the difference between the small and declining-population approaches?
 - How do you determine effective population size?
 - How do movement corridors help and hurt ecosystems?
 - What makes an area a biodiversity hot spot?
- Human Actions
 - What does critical load measure?
 - What if this is exceeded?
 - How does biological magnification affect various trophic levels?
 - How do greenhouse gases affect climate?
 - How can humans improve sustainability?